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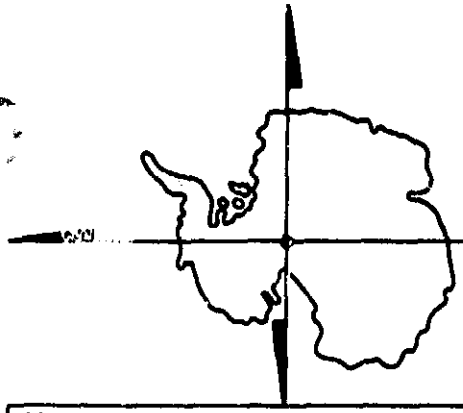

Antarctic Meteorite NEWSLETTER

A periodical issued by the Antarctic Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

Volume 8, Number 1 February, 1985

Supported by the National Science Foundation, Division of Polar Programs, and compiled at Code SN2, Johnson Space Center, NASA, Houston, Texas 77058

!!!!!!!!!!!! SAMPLE REQUEST DEADLINE: MARCH 20, 1985 (SEE PAGE 2) !!!!!!!!!!!!

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SAMPLE-REQUEST GUIDELINES

All sample requests should be made in writing to

Secretary, MWG
SN2/Planetary Materials Branch
NASA/Johnson Space Center
Houston, TX 77058 USA.

Questions pertaining to sample requests can be directed in writing to the above address or can be directed by telephone to (713) 483-3274.

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. All sample requests will be reviewed by the Meteorite Working Group (MWG), a peer-review committee that guides the collection, curation, allocation, and distribution of the U. S. Antarctic meteorites. The issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to the appropriate funding agencies. As a matter of policy, U. S. Antarctic meteorites are the property of the National Science Foundation and all allocations are subject to recall.

Each request should refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for the proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (reprints of publications that explain rationale, flow diagrams for analyses, etc.) are welcome.

Requests that are received by the MWG Secretary before March 20, 1985 will be reviewed at the MWG meeting of March 30-April 1, 1985, to be held in Houston. Requests that are received after the March 20, 1985 deadline may possibly be delayed for review until the MWG meets again in September or October, 1985. PLEASE SUBMIT YOUR REQUESTS ON TIME.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the Antarctic Meteorite Newsletter (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in the following catalogs:

Marvin, U. B. and B. Mason (eds.) (1984) Field and Laboratory Investigations of Meteorites from Victoria Land, Antarctica, Smithsonian Contr. Earth Sci. No. 26, Smithsonian Institution Press, 134 pp.

Marvin, U. B. and B. Mason (eds.) (1982) Catalog of Meteorites from Victoria Land, Antarctica, 1978-1980, Smithsonian Contr. Earth Sci. No. 24, Smithsonian Institution Press, 97 pp.

Marvin, U. B. and B. Mason (eds.) (1980) Catalog of Antarctic Meteorites, 1977-1978, Smithsonian Contr. Earth Sci. No. 23, Smithsonian Institution Press, 50 pp.

NEW METEORITES

The following pages contain preliminary descriptions and classifications of meteorites that were examined since publication of Antarctic Meteorite Newsletter, 7(2) (July, 1984). Each large (> 150-g) specimen (regardless of petrologic type) and each "pebble"-sized (< 150-g) specimen of special petrologic type (i.e., carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, stony-iron or iron) is represented by a separate description. However, "pebbles" of non-special petrologic type (i.e., equilibrated ordinary chondrite) are listed only as single-line entries in Table 1.

Each "macroscopic" description summarizes features that were visible to the eye (with, at most, 50X magnification) at the time the meteorite was first examined in the processing laboratory at NASA/JSC. Each "thin section" description represents features that were found in a survey-level examination of a polished thin section that was prepared from a small (usually exterior) chip of the meteorite. Classification is based on microscopic petrography and reconnaissance-level electron-probe microanalyses. The sample number assigned to the preliminary examination section (...,1 or ...,3, etc.) is included as an aid to workers who may later wish to intercompare samples from different locations in the meteorite.

As an aid to workers who are interested in specific types of meteorites, the preliminary examination data have also been recast into Table 2 that summarizes the newly classified samples according to petrologic type (excluding ordinary chondrites).

Meteorite descriptions contained in this issue were contributed by the following individuals:

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TABLE 1

Classification of Meteorite Samples Examined Since July, 1984

Sample Number	Weight (g)	Classification	Weathering[a]	Fracturing[b]	% Fa	% Fs
ALHA81210	0.6	H-6 Chondrite	B	A	19	17
ALHA81211	7.2	H-5 Chondrite	B	A	18	16
ALHA81212	11.5	H-4 Chondrite	B/C	B	18	16
ALHA81216	2.3	H-5 Chondrite	C	A	18	17
ALHA81219	24.4	H-5 Chondrite	B	A	19	17
ALHA81220	3.4	H-5 Chondrite	B/C	A/B	18	16
ALHA81221	9.1	L-6 Chondrite	C	A/B	25	21
ALHA81223	9.5	H-6 Chondrite	A/B	A	18	16
ALHA81224	13.6	H-6 Chondrite	B/C	A	19	17
ALHA81225	13.9	H-6 Chondrite	B	A	19	17
ALHA81226	2.9	H-5 Chondrite	C	A	19	17
ALHA81227	11.3	H-5 Chondrite	B	B	19	17
ALHA81228	7.6	H-5 Chondrite	B/C	A	18	16
ALHA81229	40.0	L-3 Chondrite	C	B/C	7-32	2-30
ALHA81230	12.5	H-5 Chondrite	B	B	18	16
ALHA81231	9.2	H-4 Chondrite	B/C	B	19	16
ALHA81232	4.6	H-5 Chondrite	B	A/B	18	16
ALHA81233	25.0	H-5 Chondrite	C	B/C	19	17
ALHA81234	4.7	H-4 Chondrite	C	A	18	16
ALHA81235	6.7	L-6 Chondrite	C	B	25	21
ALHA81236	40.9	H-5 Chondrite	A/B	A/B	18	16
ALHA81237	26.9	H-5 Chondrite	B	B	18	16
ALHA81238	24.1	H-5 Chondrite	C	B	19	16
ALHA81239	31.5	H-5 Chondrite	B	B	19	17
ALHA81240	36.9	H-5 Chondrite	C	C	19	18
ALHA81241	34.2	H-5 Chondrite	B	A/B	17	14
ALHA81242	19.9	H-5 Chondrite	B/C	A	18	17
ALHA81243	15.0	L-3 Chondrite	C	B	5-44	6-31
ALHA81244	4.6	H-5 Chondrite	B	A	19	17
ALHA81245	3.8	H-5 Chondrite	B/C	A/B	19	17
ALHA81246	3.4	H-5 Chondrite	C	A	19	17
ALHA81247	104.1	L-6 Chondrite	A/B	B	25	21
ALHA81248	4.9	H-6 Chondrite	C	A/B	18	16
ALHA81249	10.4	H-5 Chondrite	B/C	A	18	17
ALHA81250	16.9	H-6 Chondrite	B	B	18	16
ALHA81252	2.1	H-5 Chondrite	B	A	18	16
ALHA81253	10.2	H-6 Chondrite	A/B	B	18	16
ALHA81254	8.6	H-6 Chondrite	C	A	18	16
ALHA81255	11.5	H-5 Chondrite	B	B	18	16
ALHA81256	28.5	H-5 Chondrite	C	A	18	15
ALHA81257	28.7	L-6 Chondrite	B	A	24	21
ALHA81258	1.1	Carbonaceous C3V	B	A/B	0-28	0-1
ALHA81259	9.8	L-3 Chondrite	C	B	0-22	0-29
ALHA81260	124.1	E-6 Chondrite	A/B	A/B		.3
ALHA81261	11.8	H(?) Chondrite	A/B	A	11	11
ALHA81262	55.4	L-6 Chondrite	A/B	B	25	21
ALHA81263	6.0	H-5 Chondrite	B	B	18	16
ALHA81265	7.5	H-5 Chondrite	B/C	A	19	17
ALHA81266	12.3	L-6 Chondrite	A/B	B	24	21
ALHA81267	26.8	H-4 Chondrite	C	B/C	18	15-22

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
ALHA81268	17.8	H-6 Chondrite	C	B/C	18	16
ALHA81269	4.7	H-5 Chondrite	B/C	A	18	16
ALHA81270	3.8	H-5 Chondrite	C	A/B	18	16
ALHA81271	27.6	H-6 Chondrite	B	B	18	16
ALHA81272	22.8	L-3 Chondrite	C	B	2-36	3-22
ALHA81273	42.7	H-6 Chondrite	C	B/C	19	17
ALHA81274	18.5	H-5 Chondrite	A/B	A	18	16
ALHA81275	11.1	H-5 Chondrite	B	A	18	16
ALHA81276	42.2	H-5 Chondrite	C	B	18	16
ALHA81277	6.6	H-5 Chondrite	B	A	18	16
ALHA81278	1.1	L-6 Chondrite	B	A	24	21
ALHA81279	27.1	H-4 Chondrite	C	B/C	17	16
ALHA81280	54.9	L-3 Chondrite	C	B	1-32	2-24
ALHA81281	45.6	H-5 Chondrite	B	B	18	16
ALHA81282	31.1	L-6 Chondrite	A/B	A	24	21
ALHA81283	0.6	H-5 Chondrite	B/C	A	18	16
ALHA81284	9.9	H-5 Chondrite	B/C	A	19	17
ALHA81285	20.0	LL-6 Chondrite	C	A	27	23
ALHA81286	27.9	H-5 Chondrite	B	B	19	17
ALHA81287	77.5	H-5 Chondrite	C	B/C	17	15
ALHA81288	19.8	H-6 Chondrite	B	A	18	16
ALHA81289	4.2	L-6 Chondrite	A	A	24	21
ALHA81290	1.5	H-4 Chondrite	B	A	18	17
ALHA81291	3.8	H-6 Chondrite	B	A	18	16
ALHA81292	12.9	L-3 Chondrite	C	A/B	11-34	2-31
ALHA81293	2.2	H-5 Chondrite	B	A/B	18	16
ALHA81294	8.7	H-5 Chondrite	B	A	18	16
ALHA81295	105.1	H-5 Chondrite	C	B/C	19	16
ALHA81296	12.7	H-5 Chondrite	B/C	B	17	15
ALHA81297	20.1	H-5 Chondrite	B	A	18	16
ALHA81298	16.2	H-6 Chondrite	B	B	19	17
ALHA81299	0.5	L-3 Chondrite	C	A/B	1-37	2-16
ALHA81300	10.3	H-5 Chondrite	A/B	A	19	16
ALHA81301	12.5	H-5 Chondrite	B/C	A	19	16
ALHA81302	4.2	H-5 Chondrite	B/C	A	18	16
ALHA81303	3.5	H-6 Chondrite	B/C	A	18	16
ALHA81304	42.1	L-6 Chondrite	A/B	B	24	21
ALHA81305	1.1	H-5 Chondrite	B/C	A	18	16
ALHA81306	7.1	H-5 Chondrite	B	A	19	17
ALHA81307	57.0	L-6 Chondrite	B	B/C	24	21
ALHA81308	18.7	H-5 Chondrite	B/C	B	18	16
ALHA81309	0.6	H-4 Chondrite	C	A	18	16
ALHA81310	0.7	H-6 Chondrite	B	A	19	17
ALHA81311	0.9	L-6 Chondrite	B	A	24	21
ALHA81313	0.5	Shergottite (?)				38
ALHA81314	2.9	H-5 Chondrite	B	A	18	16
ALHA81315	2.4	H(?) Chondrite	A/B	A	11	11
ALH 83001	1568.6	L-4 Chondrite	B	A	23-28	20-32
ALH 83009	1.7	Aubrite	A/B	A		
ALH 83010	395.2	L-3 Chondrite	B	A	4-31	2-28
ALH 83014	1.3	Ureilite	B	A	18	15
ALH 83015	3.1	Aubrite (?)	A/B	A		
ALH 83016	4.1	Carbonaceous C2	A/B	B/C	0.3-30	0-1

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
ALH 83101	639.2	L-6 Chondrite	A	A	25	23
ALH 83102	1240.8	Carbonaceous C2	B/C	C	0-2	
EET 83200	778.8	H4-5 Chondrite	B/C	B	17-18	17-19
EET 83201	1059.8	H-6 Chondrite	B/C	A	18-20	18
EET 83202	1213.2	L5-6 Chondrite	A/B	B	24-25	22-23
EET 83203	545.6	H-5 Chondrite	B/C	B/C	20	18-21
EET 83204	376.6	LL-6 Chondrite	A	A	29-31	27
EET 83205	470.8	L-6 Chondrite	A/B	B	25	22
EET 83206	461.9	L-6 Chondrite	B	A	24	22
EET 83207	1238.3	H4-5 Chondrite	B	B	18	16-18
EET 83208	263.0	H-5 Chondrite	B/C	B	17-19	16-17
EET 83209	520.0	L-6 Chondrite	B/C	A	25	22-23
EET 83210	425.6	L-6 Chondrite	A/B	B	24-25	22
EET 83211	542.7	H-4 Chondrite	B/C	B/C	18-20	16-20
EET 83212	402.1	Eucrite (polymict)	B	B		
EET 83213	2727.0	L-3 Chondrite	B	A	13-30	3-26
EET 83214	1397.5	L-6 Chondrite	B	A	24-25	22-24
EET 83215	510.4	H5-6 Chondrite	B/C	C	18	19
EET 83224	8.6	Carbonaceous C2	A/B	B	0.2-41	0-1
EET 83225	44.0	Ureilite	B/C	B		
EET 83226	33.1	Carbonaceous C2	A/B	B	0.5-69	0.6-10
EET 83227	1973.0	Eucrite (polymict)	B	B		
EET 83228	1206.0	Eucrite (polymict)	B	B		
EET 83229	312.9	Eucrite (polymict)	B	B		
EET 83231	66.4	Eucrite (polymict)	B	A/C		
EET 83232	211.2	Eucrite (polymict)	B	A/B		
EET 83234	180.6	Eucrite (polymict)	B	B		
EET 83235	254.6	Basaltic Achon.	B	B		
EET 83236	6.4	Eucrite	B	A		
EET 83237	882.7	L-6 Chondrite	B	A/B	25-26	23-25
EET 83246	48.3	Diogenite	A/B	A/B		
EET 83247	22.5	Aubrite (?)	B/C	B		
EET 83250	11.5	Carbonaceous C2	B	C	0.3-22	2-14
EET 83251	261.4	Eucrite (polymict)	B	A/B		
EET 83283	57.2	Eucrite (polymict)	B	B		

[a] Degree of "weathering" is based on a macroscopic, visual estimate of the relative "rustiness" of a sample and is made at the time of initial processing.

Degrees of weathering for meteorites that do not contain metal are based mostly on overall rustiness whereas degrees of weathering assigned to metal-bearing meteorites are influenced largely by rustiness of metal grains. Therefore, the A-B-C scale assigned to achondrites is not strictly comparable to the A-B-C scale assigned to chondrites.

Given those caveats, the weathering categories are defined as follows:

A: Minor rustiness; rust haloes on metal particles are inconspicuous and rust stains along fractures are minor.

B: Moderate rustiness; large rust haloes occur on metal particles and rust stains on internal fractures are extensive.

C: Severe rustiness; metal particles have been mostly, if not totally, converted to rust and specimen is uniformly stained by rust throughout.

[b] Degree of "fracturing" is based on a macroscopic, visual estimate of the abundance and size of cracks in a sample and is made at the time of initial processing of the specimen.

The "fracturing" categories are defined as follows:

A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.

B: Moderate cracks; several cracks extend across exterior surfaces of the specimen and can be readily broken along the cracks.

C: Severe cracks; specimen readily crumbles along cracks that are both extensive and abundant.

TABLE 2

Petrological Groupings of Special Meteorites Examined Since July, 1984

Achondrites

Sample Number	Weight (g)	Classification	Weathering[a]	Fracturing[b]	% Fa	% Fs
ALH 83009	1.7	Aubrite	A/B	A		
ALH 83015	3.1	Aubrite (?)	A/B	A		
EET 83247	22.5	Aubrite (?)	B/C	B		
EET 83235	254.6	Basaltic Achon.	B	B		
EET 83246	48.3	Diogenite	A/B	A/B		
EET 83236	6.4	Eucrite	B	A		
EET 83212	402.1	Eucrite (polymict)	B	B		
EET 83227	1973.0	Eucrite (polymict)	B	B		
EET 83228	1206.0	Eucrite (polymict)	B	B		
EET 83229	312.9	Eucrite (polymict)	B	B		
EET 83231	66.4	Eucrite (polymict)	B	A/C		
EET 83232	211.2	Eucrite (polymict)	B	A/B		
EET 83234	180.6	Eucrite (polymict)	B	B		
EET 83251	261.4	Eucrite (polymict)	B	A/B		
EET 83283	57.2	Eucrite (polymict)	B	B		
ALHA81313	0.5	Shergottite (?)				38
ALH 83014	1.3	Ureilite	B	A	18	15
EET 83225	44.0	Ureilite	B/C	B		

Carbonaceous Chondrites

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 83016	4.1	Carbonaceous C2	A/B	B/C	0.3-30	0-1
ALH 83102	1240.8	Carbonaceous C2	B/C	C	0-2	
EET 83224	8.6	Carbonaceous C2	A/B	B	0.2-41	0-1
EET 83226	33.1	Carbonaceous C2	A/B	B	0.5-69	0.6-10
EET 83250	11.5	Carbonaceous C2	B	C	0.3-22	2-14
ALHA81258	1.1	Carbonaceous C3V	B	A/B	0-28	0-1

Chondrites -- Type 3

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALHA81229	40.0	L-3 Chondrite	C	B/C	7-32	2-30
ALHA81243	15.0	L-3 Chondrite	C	B	5-44	6-31
ALHA81259	9.8	L-3 Chondrite	C	B	0-22	0-29
ALHA81272	22.8	L-3 Chondrite	C	B	2-36	3-22
ALHA81280	54.9	L-3 Chondrite	C	B	1-32	2-24
ALHA81292	12.9	L-3 Chondrite	C	A/B	11-34	2-31
ALH 83010	395.2	L-3 Chondrite	B	A	4-31	2-28
EET 83213	2727.0	L-3 Chondrite	B	A	13-30	3-26

Chondrites - Type 4

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALHA81212	11.5	H-4 Chondrite	B/C	B	18	16
ALHA81231	9.2	H-4 Chondrite	B/C	B	19	16
ALHA81234	4.7	H-4 Chondrite	C	A	18	16
ALHA81267	26.8	H-4 Chondrite	C	B/C	18	15-22
ALHA81279	27.1	H-4 Chondrite	C	B/C	17	16
ALHA81290	1.5	H-4 Chondrite	B	A	18	17
ALHA81309	0.6	H-4 Chondrite	C	A	18	16
EET 83211	542.7	H-4 Chondrite	B/C	B/C	18-20	16-20
EET 83200	778.8	H4-5 Chondrite	B/C	B	17-18	17-19
EET 83207	1238.3	H4-5 Chondrite	B	B	18	16-18
ALHA81299	0.5	L-3 Chondrite	C	A/B	1-37	2-16
ALH 83001	1568.6	L-4 Chondrite	B	A	23-28	20-32

[a]Refer to footnotes in Table 1

[b]Refer to footnotes in Table 1

Sample No.: ALHA81258 Location: Allan Hills
Weight (g): 1.1 Field No.: 1651
Dimensions (cm): 1 x 1 x 0.5
Meteorite Type: C3V Chondrite

Macroscopic Description: Roberta Score

The stone is mostly covered with a vesicular black fusion crust.

Thin-Section (,1) Description: Brian Mason

The section shows numerous chondrules up to 2 mm across and irregular crystalline aggregates, up to 3 mm in maximum dimension, set in a minor amount of dark brown to black, semi-opaque matrix. The chondrules and aggregates consist mainly of granular olivine with minor amounts of polysynthetically twinned pyroxene. Trace amounts of nickel-iron are present as minute grains. Sulfide is present in small amounts, finely dispersed throughout the matrix and sometimes concentrated in chondrule rims. Microprobe analyses of chondrule olivine show a wide compositional range: Fa0-28, mean Fa11. The matrix appears to consist largely of fine-grained iron-rich olivine, Fa40-60. Pyroxene in the chondrules is clinoenstatite, mostly near Fs1, but with occasional Fe-rich grains. The meteorite is a C3V chondrite, very similar to ALHA81003; the possibility of pairing should be considered.

Sample No.: ALHA81260 Location: Allan Hills
Weight (g): 124.1 Field No.: 1432
Dimensions (cm): 4.5 x 5 x 3
Meteorite Type: E6 Chondrite

Macroscopic Description: Roberta Score

Weathered fusion crust covers approximately 80% of this meteorite fragment. The one fracture surface has a deep reddish-brown color. Evaporite deposit is abundant immediately beneath the fusion crust and occurs in minute quantities on the exterior surfaces. The stone is extremely hard to break. The interior matrix has an overall bluish-black color. Under the binocular microscope crystal faces are visible.

Thin Section (,3) Description: Brian Mason

Only vague traces of chondritic structure are visible in the section which consists largely of granular enstatite, with considerable nickel-iron (approximately 20%) and minor amounts of sulfides and plagioclase. Remnants of fusion crust are present. Weathering is minor, with a little limonitic staining around some metal grains. Microprobe analyses show the enstatite is almost pure $MgSiO_3$ (Ca 0.8%, FeO 0.2%, Al_2O_3, TiO_2, MnO 0.1%); plagioclase is somewhat variable in composition, An13-19. The meteorite is an E6 chondrite; the only other E6 chondrite from the Allan Hills, ALHA81021, is similar but appears to be more weathered. The possibility of pairing should be considered.

Sample No.: ALHA81261
Weight (g): 11.8
Dimensions (cm): 2 x 1.5 x 1.5
Meteorite Type: H(?) Chondrite

Location: Allan Hills
Field No.: 1255

Macroscopic Description: Roberta Score

Brown and black fusion crust covers 50% of this meteorite fragment. The interior is medium to light gray in color. Metal is abundant. A weathering rind was exposed when the stone was chipped.

Thin Section (,2) Description: Brian Mason

The section shows that this meteorite is an equigranular (grains 0.1-0.4 mm) aggregate of approximately equal amounts of olivine and orthopyroxene, with minor amounts of nickel-iron, plagioclase, troilite, diopside, and accessory chromite. A little limonitic staining is present around metal grains. Microprobe analyses show the minerals are uniform in composition: olivine, Fa 11.3; orthopyroxene, Wo2Fs11; plagioclase, An14Or4. This specimen is identical in all respects with ALHA77081, classed as an H(?) meteorite, and the two are almost certainly paired. The mineral analyses are indistinguishable from those of Acapulco (Palme et al., Geochimica et Cosmochimica Acta, 45, p. 728, 1981).

Sample No.: ALHA81313
Weight (g): 0.5
Dimensions (cm): 0.8 x 0.7 x 0.4
Meteorite Type: Shergottite (?)

Location: Allan Hills
Field No.: 1680

Macroscopic Description: Roberta Score

The stone is dark in color. The interior was not examined because this small specimen was not chipped and the entire mass was made into a thin section.

Thin Section (,1) Description: Brian Mason

The section shows a granular aggregate (grains 1-3 mm in maximum dimensions) of colorless plagioclase (maskelynite) and pale gray, weakly pleochroic pyroxene with trace amounts of opaque minerals (nickel-iron, troilite, chromite). A vague impression of pyroxene-rich and plagioclase-rich layers is present, possibly suggesting a cumulate. The pyroxene appears to be an inverted pigeonite with small blebs of exsolved augite. Point counting gives the following volume percentages: pyroxene, 54; plagioclase, 46. Microprobe analyses show the maskelynite is essentially stoichiometric and fairly uniform in composition, average An93 (Na_2O 0.6-1.4%, K_2O 0.04). Orthopyroxene composition is also fairly uniform, (average Ca 2.7 Fe 38; Al_2O_3 0.4%, MnO 0.9%, TiO_2 0.2%, Cr_2O_3 0.3%). Composition of a single augite bleb is Ca38Fe20. In texture and mineral compositions this meteorite closely resembles the Moama monomict eucrite (Meteoritics, 10, p. 101, 1975). However, the presence of maskelynite indicates that ALHA81313 may be classed petrographically as a shergottite rather than a eucrite.

Sample No.: ALHA81315 Location: Allan Hills
Weight (g): 2.4 Field No.: 1674
Dimensions (cm): 1.5 x 1 x 1
Meteorite Type: H(?) Chondrite

Macroscopic Description: Roberta Score

Eighty percent of this meteorite is covered with fusion crust. Matrix is gray in color. It contains many darker colored submillimeter inclusions. Metal is abundant. Oxidation is scattered evenly throughout the interior.

Thin Section (,1) Description: Brian Mason

ALHA81315 is a small specimen which has texture and mineral compositions essentially identical to ALHA81261, classed as an H(?) meteorite, and is probably paired with it and ALHA77081.

Sample No.: ALH83001 Location: Allan Hills
Weight (g): 1568.6 Field No.: 2559
Dimensions (cm): 17.5 x 9 x 6.5
Meteorite Type: L4 Chondrite

Macroscopic Description: Roberta Score

Shallow regmaglypts are present on exterior of this fusion crusted stone.

Most of the interior that was exposed by chipping is weathered but may not be representative of the entire stone. The less weathered material is medium gray in color and contains chondrules.

Thin Section (,3) Description: Glenn MacPherson

Light to moderate limonitic staining indicates mild weathering.

Chondrules up to 2.5 mm diameter are sharply defined. Brown glass is turbid and birefringent. Monoclinic pyroxene is abundant and has an observed composition range of Fs20 to Fs32. Olivine was found in the composition range Fa23 to Fa28. Metal (mostly one phase) and troilite are subequal in amount.

This meteorite is probably an L4 chondrite.

Sample No.: ALH83009 Location: Allan Hills
Weight (g): 1.7 Field No.: 2100
Dimensions (cm): 1.5 x 1.0 x 0.5
Meteorite Type: Aubrite

Macroscopic Description: Roberta Score

This specimen is white in color and is identical to ALH83015.

Thin Section (,1) Description: Jeremy Delaney

This is a coarse-grained, brecciated aubrite with several unbrecciated lithic fragments preserved. Orthopyroxene grains have interfingering texture. One grain with inclined extinction appears to be clinoenstatite. Generally no exsolution was observed. One small calcic pyroxene was observed in a 1 mm + orthopyroxene grain containing needle-like inclusions. Some orthopyroxene grains contain rounded melt pockets with extremely fine-grained needle-like crystallites of unidentified silicates. Orthopyroxene is En99.6Wo0.34 and feldspar is Ab90Or3.2. Other phases include daubreelite, alabandite, Fe-Ni metal and Ti-bearing troilite.

Sample No.: ALH83010 Location: Allan Hills
Weight (g): 395.2 Field No.: 2144
Dimensions (cm): 10.5 x 8 x 2
Meteorite Type: L3 Chondrite

Macroscopic Description: Carol Schwarz

Black to iridescent fusion crust occurs on one side of this meteorite fragment. The other surfaces are dark greenish gray with areas of iridescent reddish brown. Numerous chondrules (1-4 mm in diameter) as well as large clasts (the largest is 1.0 x 0.5 cm) are visible on the fracture surface.

This sample is extremely coherent. The interior exposed consists of a dark matrix with numerous 1-mm-sized chondrules, gray to yellowish in color. Metal is present.

Thin Section (,3) Description: Glenn MacPherson

Pervasive light limonitic staining suggests moderate weathering.

Chondrules up to 2.5 mm diameter are sharply defined, and many contain clear brown isotropic glass. Pyroxene is mostly monoclinic and was found in the range Fs2 to Fs28. Olivine was found in the range Fa4 to Fa31. Metal is subequal with (or slightly less than) troilite in abundance. There are well defined sulfide rims around many chondrules. Two metal phases are present. Chromite is accessory but is generally very fine grained.

This meteorite is probably an L3 chondrite.

Sample No.: ALH83014 Location: Allan Hills
Weight (g): 1.3 Field No.: 2136
Dimensions (cm): 1 x 0.5 x 0.5
Meteorite Type: Ureilite

Macroscopic Description: Roberta Score

Weathered fusion crust covers only one surface of this ureilite. Well-developed crystal faces are visible on all other surfaces. The overall color is reddish-brown.

Thin Section (,2) Description: Brian Mason

The thin section shows an aggregate of rounded to subhedral grains (0.6-3 mm across) of olivine with minor pyroxene. Small platy crystals of graphite are present in carbonaceous rims to the silicate grains. Trace amounts of troilite and nickel-iron are present, the latter largely altered to translucent brown limonite concentrated along grain boundaries. Microprobe analyses show olivine of uniform composition (Fa18) with notably high CaO (0.4%) and Cr2O3 (0.7%) contents; the pyroxene is a pigeonite of composition Wo8Fs15. This meteorite is a ureilite; it appears to be relatively unshocked compared to most ureilites.

Sample No.: ALH83015 Location: Allan Hills
Weight (g): 3.1 Field No.: 2138
Dimensions (cm): 1.5 x 1.5 x 1
Meteorite Type: Aubrite (?)

Macroscopic Description: Roberta Score

This specimen is white in color and is identical in appearance to ALH83009.

Thin Section (,2) Description: Jeremy Delaney

ALH83015 is a pyroxenite breccia with clasts up to 1-5 mm. Matrix is very fine-grained with brown/green staining common. Pyroxene grains often contain submicron to 10 micron opaque (troilite?) inclusions on healed cracks. One heavily clouded pyroxene is also present. Areas of fine-grained breccia against coarse-grained breccia occur. Tiny olivine-troilite clasts are present, as are small matrix olivines. Large orthopyroxene clasts have mottled appearance and appear shocked. The pyroxene has no micron or larger scale exsolution and appears to be orthopyroxene. Brown staining caused by weathering of metal/troilite stains most grain boundaries and large troilite or metal clasts often have "rusty" halos. This specimen may be similar to the 83009 aubrite. Minor phases include daubreelite, alabandite, metal and Ti-bearing troilite.

Sample No.: ALH83016 Location: Allan Hills
Weight (g): 4.1 Field No.: 2142
Dimensions (cm): 3 x 2 x 0.8
Meteorite Type: C2 Chondrite

Macroscopic Description: Roberta Score

Fusion crust covers most of ALH83016. One surface is iridescent coppery-brown in color but other surfaces are dull black and polygonally fractured.

The stone broke apart into centimeter-size (and smaller) pieces, leaving no original surfaces. The interior is black with abundant irregular shaped white inclusions and some chondrules.

Thin Section (,5) Description: Brian Mason

The thin section shows a few poorly defined chondrules up to 1.8 mm across, consisting of granular or barred olivine with minor polysynthetically twinned clinopyroxene. The bulk of the meteorite consists of opaque to translucent brown to black matrix. Scattered through the matrix are colorless birefringent grains, mostly olivine, up to 0.3 mm but usually less than 0.1 mm across. Trace amounts of nickel-iron and sulfides are dispersed throughout the section as minute grains. Well-preserved fusion crust rims part of the section. Microprobe analyses show that both olivine and pyroxene vary in composition. Olivine ranges from Fa0.3 to Fa30, with a mean of Fa11; it has a notable chromium content, Cr2O3 ranging from 0.1 to 0.5 weight percent. Pyroxene is generally close to clinoenstatite in composition. The meteorite is a C2 chondrite.

Sample No.: ALH83101 Location: Allan Hills
Weight (g): 639.2 Field No.: 1471
Dimensions (cm): 9 x 8 x 5.5
Meteorite Type: L6 Chondrite

Macroscopic Description: Carol Schwarz

This smooth rounded specimen is covered with black, polygonally fractured fusion crust. One surface is flat and iridescent. There are several areas where fusion crust has weathered away revealing a rough reddish surface with areas of gray matrix visible.

The interior is light gray and lightly dotted with oxidation. Metal flecks are numerous. The fusion crust is thick and tends to spall off.

Thin Section (,4) Description: Glenn MacPherson

Light limonitic stain is present locally, suggesting mild weathering.

Chondrules up to 1.5 mm diameter are weakly preserved. A well developed polygonal-granular texture is present locally in the matrix, but the grain size is variable. Plagioclase (An12;Ab84;Or4) is abundant and coarse. Pyroxene (Fs23) is mostly orthorhombic. Olivine is uniformly Fa25. Metal (mostly one-phase) and troilite are subequal in amount.

This meteorite is an L6 chondrite.

Sample No.:	ALH83102	Location:	Allan Hills
Weight (g):	1240.8 (2 pieces)	Field No.:	2123
Dimensions (cm):	12 x 9 x 9 and 7.5 x 7.5 x 5		
Meteorite Type:	C2 Chondrite		

Macroscopic Description: Roberta Score

ALH83102 consists of 20 or more pieces--only two of the larger pieces have been examined to date.

Both pieces are extensively fractured and extremely friable. A small area of fusion crust is present. White evaporite deposit is present on both interior and exterior surfaces. Matrix ranges in color from greenish-black to black and contains small white inclusions. Areas of heavy oxidation were noted.

Thin Section (,25 and ,26) Description: Glenn MacPherson

These two meteorite fragments are identical and probably paired.

The specimens are intensely altered: matrix, inclusions and chondrules are almost completely replaced by iron-rich phyllosilicates, calcite, and iron oxides. The matrix is opaque and black except where the sections are unusually thin. Olivine grains are sporadically preserved, and are mostly Fa0-2, although some range down to Fa42. One small spinel-rich refractory spherule was found, in which the spinel is nearly pure $MgAl_2O_4$. No other primary phases were found in this spherule.

These meteorites are probably fragments of one C2 carbonaceous chondrite. They are probably paired with ALH83100.

Sample No.:	EET83200	Location:	Elephant Moraine
Weight (g):	778.8	Field No.:	1420
Dimensions (cm):	10 x 8 x 5		
Meteorite Type:	H4-5 Chondrite		

Macroscopic Description: Carol Schwarz

This angular chondrite is covered with a weathered black fusion crust, pitted with oxidation. One surface is broken and weathered to a shiny dark brown. Thin flow lines occur on part of one surface.

The interior is a dark reddish-brown with a small band of relatively unweathered material.

Thin Section (,4) Description: Glenn MacPherson

Moderate limonitic staining everywhere suggests moderate weathering.

Chondrules up to approximately 2.5-mm diameter are sharply defined, some with microcrystalline structure preserved. Glass is recrystallized. Monoclinic pyroxene (Fs17-19) is abundant. Olivine is highly uniform in composition, Fa17-18. Metal is much more abundant than troilite; two metal phases are present. Chromite is accessory.

This meteorite is an H4-5 chondrite.

Sample No.: EET83201 Location: Elephant Moraine
Weight (g): 1059.8 Field No.: 2946
Dimensions (cm): 10 x 8 x 7
Meteorite Type: H6 Chondrite

Macroscopic Description: Carol Schwarz

This polished and rounded specimen has no fusion crust remaining.

EET83201 was chipped along a crack, exposing an interior that is reddish-brown with metal flecks visible.

Thin Section (,3) Description: Glenn MacPherson

Abundant interstitial patches of deep red hematite (?) suggest moderate weathering.

Chondrules up to 2 mm diameter are weakly preserved in a matrix that is intensely recrystallized to a coarse polygonal-granular texture.

Plagiocalse (An13-14;Ab80-81;Or6) is well-developed and abundant. Pyroxene (Fs18) is uniformly orthorhombic. Olivine is Fa18-20 in composition. Metal and troilite are roughly equal in abundance. Kamacite, anisotropic tetrataenite, and probably taenite are present. Chromite is accessory.

This meteorite is an H6 chondrite.

Sample No.: EET83202 Location: Elephant Moraine
Weight (g): 1213.2 Field No.: 1446
Dimensions (cm): 12 x 7 x 7.5
Meteorite Type: L5-6 Chondrite

Macroscopic Description: Rene' Martinez

This meteorite is roughly rectangular in shape. Approximately 50% of its exterior surface retains fusion crust. Where the fusion crust has weathered away, the surface is smooth and reddish-brown. Fractures are numerous.

The interior is light and dark gray with abundant mm-size light inclusions.

Thin Section (,3) Description: Glenn MacPherson

Some limonitic stain is locally present, suggesting light weathering.

Chondrules up to 1.5-mm diameter are sharply defined. The meteorite is brecciated. The clasts have well-developed plagioclase, but that in the matrix is much finer grained. Olivine is uniformly Fa24-25. Pyroxene (Fs22-23) is mostly orthorhombic. Metal and troilite are subequal but low in abundance. Anisotropic tetrataenite (approx. 55% Ni) was found, in addition to kamacite.

The meteorite is an L5-6 chondrite.

Sample No.: EET83203 Location: Elephant Moraine
Weight (g): 545.6 Field No.: 2941
Dimensions (cm): 6.5 x 7.5 x 6
Meteorite Type: H5 Chondrite

Macroscopic Description: Carol Schwarz

No fusion crust remains on this smooth reddish-brown chondrite. Several deep parallel fractures penetrate the interior.

Interior is reddish-brown in color with some areas being less weathered than others. Metal flecks are visible.

Thin Section (,3) Description: Glenn MacPherson

Heavy limonitic stain everywhere indicates moderate to heavy weathering.

Chondrules up to approximately 2-mm diameter are weakly preserved, but some do retain microcrystalline structure. Plagioclase is present but is very fine grained and commonly maskelynitized. Olivine is mostly Fa20, but ranges from Fa18 to Fa23. Pyroxene (Fs18-21) is mostly orthorhombic. Metal (commonly as two coarsely intergrown phases) is somewhat more abundant than troilite. Chromite is accessory.

This meteorite is an H5 chondrite.

Sample No.: EET83204 Location: Elephant Moraine
Weight (g): 376.6 Field No.: 1350
Dimensions (cm): 8 x 6 x 5
Meteorite Type: LL6 Chondrite

Macroscopic Description: Carol Schwarz

The fusion crust is polygonally fractured and has spalled off in large areas of this specimen. Areas devoid of fusion crust have a rough texture.

The interior is gray. No weathering is visibly apparent except for a discontinuous darker gray rind and several reddish halos. Metal flecks are present.

Thin Section (,4) Description: Glenn MacPherson

Light, local limonitic staining suggests some mild weathering.

Chondrules up to 2-mm diameter are very weakly defined. The matrix is intensely recrystallized to a well-developed polygonal granular texture. Plagioclase (An11;Ab76-84;Or5-13) is abundant and coarse. Olivine is uniformly Fa29-31. Pyroxene (Fs27) is orthorhombic. Metal and troilite are both very low in abundance. The metal is two-phase, mostly as coarse patchy intergrowths.

This meteorite is an LL6 chondrite.

Sample No.: EET83205
Weight (g): 470.8
Dimensions (cm): 8 x 7 x 4
Meteorite Type: L6 Chondrite

Location: Elephant Moraine
Field No.: 2972

Macroscopic Description: Carol Schwarz

This chondrite has patches of shiny fusion crust scattered over its otherwise reddish-brown surface. Several fractures penetrate the interior.

The interior is light to yellowish-gray. A weathering rind was exposed that ranges in color from gray to reddish-brown.

Thin Section (,3) Description: Glenn MacPherson

Moderate amounts of limonitic staining suggest mild to moderate weathering.

Chondrules up to 1.2-mm diameter are moderately-well preserved in a clear matrix that locally has a well-developed polygonal-granular texture. There are abundant interstitial, polygonal plagioclase grains. Pyroxene (Fs22) is largely orthorhombic, and is commonly associated with secondary calcite. Olivine is uniformly Fa25. Metal and troilite are roughly equal in abundance. Two metal phases are present as coarse patchy intergrowths. Chromite is an abundant accessory.

The meteorite is an L6 chondrite.

Sample No.: EET83206
Weight (g): 461.9
Dimensions (cm): 10 x 5 x 4.5
Meteorite Type: L6 Chondrite

Location: Elephant Moraine
Field No.: 2848

Macroscopic Description: Carol Schwarz

EET83206 is a rectangular shaped specimen that is covered with black to reddish-brown fusion crust.

The interior is a grayish color with a discontinuous weathering rind and some large oxidation halos. Glassy veinlets crisscross the interior of the meteorite.

Thin Section (,3) Description: Glenn MacPherson

Chondrules up to 2-mm diameter are faintly preserved in a matrix that is intensely recrystallized to a coarse polygonal granular texture. Interstitial plagioclase (An11;Ab84;Or5) is abundant and coarse. Olivine is uniformly Fa24. Pyroxene (Fs22) is orthorhombic. Metal and troilite are subequal in abundance. Some of the larger metal grains contain plessite intergrowths.

The meteorite is an L6 chondrite.

Sample No.: EET83207 Location: Elephant Moraine
Weight (g): 1238.3 Field No.: 1378
Dimensions (cm): 15 x 7.5 x 7
Meteorite Type: H4-5 Chondrite

Macroscopic Description: Carol Schwarz

Black to reddish-brown fusion crust covers this oblong meteorite. Several deep fractures penetrate the interior, one splitting the sample nearly in half.

The interior is mostly dark reddish-brown. There are small areas of less weathered yellowish matrix still present.

Thin Section (,4) Description: Glenn MacPherson

Limonitic stain is pervasive, suggesting moderate weathering.

Chondrules up to 2-mm diameter are well-defined. Microcrystalline structure is preserved, but glass is recrystallized. Olivine is uniformly Fa18. Monoclinic pyroxene (Fs16-18) is common. Metal is more abundant than troilite. Tetrataenite (Ni 55%) is present in addition to kamacite. Chromite is accessory.

The meteorite is an H4-5 chondrite.

Sample No.: EET83208 Location: Elephant Moraine
Weight (g): 263.0 Field No.: 1372
Dimensions (cm): 11 x 5.5 x 3
Meteorite Type: H5 Chondrite

Macroscopic Description: Carol Schwarz

This meteorite fragment is totally covered by a smooth black fusion crust. Large halos occur on the fusion crust. Several penetrating fractures and a number of regmaglypts are present.

The sample broke in half along a fracture and the interior is extensively weathered. Further chipping revealed a less weathered dark interior with no features visible.

Thin Section (,3) Description: Glenn MacPherson

Deep limonitic stain is pervasive, suggesting moderate to heavy weathering.

Chondrules up to 1.5 mm diameter are rather well-preserved. There is some very fine-grained interstitial plagioclase. Pyroxene (Fs16-17) is commonly monoclinic. Olivine is uniformly Fa17-19. Metal is abundant and exceeds troilite in amount. Tetrataenite (approx. 55% Ni) and kamacite were both found. Chromite is accessory.

This meteorite is an H5 chondrite.

Sample No.: EET83209 Location: Elephant Moraine
Weight (g): 520.0 Field No.: 1367
Dimensions (cm): 8 x 7 x 6
Meteorite Type: L6 Chondrite

Macroscopic Description: Carol Schwarz

This meteorite is rounded and smooth with only a few scattered areas of fusion crust remaining. The exterior surfaces are reddish-brown and slightly polished.

The interior material exposed is reddish to yellowish in color, heavily weathered with some metal flecks visible. The weathering may not be representative of the entire sample.

Thin Section (,3) Description: Glenn MacPherson

Heavy limonitic staining suggests moderate to heavy weathering.

Chondrules up to 2-mm diameter have very weakly defined outlines that grade into a strongly recrystallized, polygonal granular-textured matrix. Plagioclase (An11;Ab80-83;Or6-8) is abundant and coarse, but locally is maskelynitized. Olivine is mostly Fa25; one grain of Fa29 was found. Pyroxene is all orthorhombic and mostly Fs22-23, but one grain of Fs25 was found. Troilite is more abundant than metal. Two metal phases are present, mostly as coarse patchy intergrowths but locally as plessite. Chromite is accessory.

This meteorite is an L6 chondrite.

Sample No.: EET83210 Location: Elephant Moraine
Weight (g): 425.6 Field No.: 2845
Dimensions (cm): 9.5 x 6 x 6
Meteorite Type: L6 Chondrite

Macroscopic Description: Carol Schwarz

Patches of fusion crust remain on 30% of this meteorite fragment. The other surfaces are smooth and reddish-brown.

The interior is gray with some oxidation staining. A discontinuous gray weathering rind was exposed. Metal flecks are present.

Thin Section (,3) Description: Glenn MacPherson

Moderate amounts of limonitic staining suggest moderate weathering.

Chondrules up to 1.5-mm diameter are rather well-preserved in this moderately recrystallized meteorite. Plagioclase (An11;Ab85;Or4) is abundant and mostly rather fine grained, but coarser polygonal crystals are found. Pyroxene (Fs22) is orthorhombic. Olivine is uniformly Fa24-25. Metal and troilite are subequal in abundance. Two metal phases are present, mostly as coarse patchy intergrowths but locally as plessite. Chromite is an abundant accessory.

This meteorite is an L6 chondrite.

Sample No.: EET83211 Location: Elephant Moraine
Weight (g): 542.7 Field No.: 1352
Dimensions (cm): 10 x 7 x 3.5
Meteorite Type: H4 Chondrite

Macroscopic Description: Carol Schwarz

Weathered, polygonally fractured fusion crust occurs on 75% of this meteorite fragment. The surface is iridescent in areas and a minor amount of evaporite deposit has formed. The broken surfaces are reddish-brown and quite smooth. Numerous fractures penetrate the specimen.

The interior is extremely weathered although some metal is visible.

Thin Section (,4) Description: Glenn MacPherson

Intense limonitic stain everywhere, together with hematite veins, indicate heavy weathering.

Chondrules up to approximately 0.6-mm diameter are sharply defined. Microcrystalline structure is well-preserved. Some very fine-grained plagioclase (An12;Ab83;Or5) was found. Pyroxene (Fs16-20) is commonly monoclinic. Olivine is uniformly Fa18-20. Metal is very abundant and exceeds troilite in amount. Kamacite and apparently some anisotropic tetrataenite were found.

This meteorite is an H4 chondrite.

Sample No.: EET83212 Location: Elephant Moraine
Weight (g): 402.1 Field No.: 2877
Dimensions (cm): 7 x 6 x 7
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

The exterior color of this achondrite ranges from medium gray to brown-gray with the exception of thin dull black fusion crust that covers two surfaces.

The interior is gray in color and rich in clasts that may include eucritic and black fine-grained materials. A one-centimeter-thick weathering rind was exposed when the stone was chipped. The stone is similar to other 1983 Elephant Moraine eucrites.

Thin Section (,2) Description: Jeremy Delaney

This thin section of a polymict eucrite is dominated by a single, very fine-grained mafic clast of the type common in both Allan Hills and Elephant Moraine polymict eucrites. Numerous small mineral clasts are included in this clast.

Several outer parts of this fine-grained clast that border the coarser-grained matrix are darker, either because of fine-grain size or the presence of Fe-oxide weathering products. Some mineral clasts have dark fine-grained "chill zones" around them. Pyroxene clasts within this dark clast have a variety of coarse and fine exsolution while feldspar clasts are partly maskelynitized. One feldspar clast has a glassy core with a feldspar rim that mimics the shape of this clast. Heating by the mafic melt that quenched to form the dark clast apparently devitrified previously shocked feldspar grains.

The "normal" breccia of 83212 contains breccia clasts, basaltic clasts with clouded pyroxene and intergranular texture, granular mafic clasts with recrystallized pyroxene, and some fine exsolution with some glassy material present. No orthopyroxene was observed.

Sample No.: EET83213 Location: Elephant Moraine
Weight (g): 2727.0 Field No.: 2875
Dimensions (cm): 16 x 15 x 7
Meteorite Type: L3 Chondrite

Macroscopic Description: Carol Schwarz

Dull fractured fusion crust occurs on most of EET83213. Evaporite deposit is present on several surfaces. Interior is greenish-gray with numerous white, cream, and darker gray colored inclusions/chondrules. Metal is present.

Thin Section (,4) Description: Glenn MacPherson

Moderate limonitic staining is locally present, suggesting mild to moderate weathering.

Chondrules up to 3-mm diameter are very sharply defined, and set in a brown matrix. Isotropic clear brown glass is preserved in some chondrules. Monoclinic pyroxene is very common and was found in the composition range Fs3 to Fs26. The range of olivine compositions found is Fa13 to Fa30. Metal and troilite are subequal in amount. At least two metal phases are present in plessitic intergrowths, and tetrataenite may also be present.

This meteorite is probably an L3 chondrite.

Sample No.: EET83214 Location: Elephant Moraine
Weight (g): 1397.5 Field No.: 1326
Dimensions (cm): 12 x 10 x 7.5
Meteorite Type: L6 Chondrite

Macroscopic Description: Carol Schwarz

Seventy-five percent of the exterior of this specimen is covered with a fractured and weathered black fusion crust. The remainder of the surfaces are reddish-brown, have a rough texture, and show some yellowish matrix. A 5-mm-thick reddish-brown weathering rind was revealed by chipping. The interior is gray with some oxidation. Metal is abundant.

Thin Section (,3) Description: Glenn MacPherson

Moderate amounts of limonitic staining suggest moderate weathering.

Chondrules up to 3.5 mm diameter are fairly well preserved, but their borders grade into the matrix. A strong polygonal granular texture is locally developed, but the grain size varies. Plagioclase (An11;Ab84;Or5) is abundant and coarse. Metal and troilite are subequal in amount. Two metal phases are present, commonly in plessitic intergrowths. Chromite is abundant. Olivine is uniformly Fa24-25. Pyroxene (Fs22-24) is orthorhombic.

This is an L6 chondrite.

Sample No.: EET83215 Location: Elephant Moraine
Weight (g): 510.4 Field No.: 1336
Dimensions (cm): 9 x 7 x 6 (reassembled)
Meteorite Type: H5-6 Chondrite

Macroscopic Description: Carol Schwarz

This stone consists of three pieces (one large and two small) which fit together perfectly. The exterior surface is shiny, smooth, and reddish-brown with some remnant fusion crust. Fracturing is extensive.

The interior surfaces are heavily weathered. Some metal was noted.

Thin Section (,3) Description: Glenn MacPherson

This meteorite is heavily stained with limonite, suggesting moderate weathering.

Chondrules up to 2-mm diameter are fairly well-preserved, some retaining microcrystalline structure. Plagioclase is abundant and coarse but is highly maskelynitized. Olivine and mostly-orthorhombic pyroxene are very uniform in composition, Fa18 and Fs19 respectively. Metal is more abundant than troilite. Two metal phases are present; some tetrataenite (approx. 52% Ni) was found. Chromite is accessory.

This is an H5-6 chondrite.

Sample No.: EET83224 Location: Elephant Moraine
Weight (g): 8.6 Field No.: 2785
Dimensions (cm): 2.5 x 2.5 x 1.5
Meteorite Type: C2 Chondrite

Macroscopic Description: Roberta Score

One quarter of EET83224 is covered by dull fractured fusion crust. The exterior surfaces range in color from black to brown.

Chondrules are present in the black matrix as are many small irregular shaped white inclusions.

Thin Section (,3) Description: Brian Mason

The thin section shows a few chondrules up to 0.8-mm in diameter, consisting of granular olivine sometimes together with minor polysynthetically twinned clinopyroxene. Scattered through the opaque to translucent brown to black matrix are numerous irregular enclaves (possibly chondrule fragments) and small (0.1 mm or less) colorless birefringent grains, mostly olivine. Accessory nickel-iron and trace amounts of sulfide are dispersed throughout the section as minute grains. Microprobe analyses give the following compositions: olivine, Fa0.2 - Fa41, mean Fa8; pyroxene is generally near clinoenstatite in composition (FeO 0.4-1.0%). The meteorite is a C2 chondrite.

Sample No.: EET83225 Location: Elephant Moraine
Weight (g): 44.0 Field No.: 2798
Dimensions (cm): 5 x 2.5 x 2.5
Meteorite Type: Ureilite

Macroscopic Description: Roberta Score

The fusion crust on this ureilite is very thin. The exterior surfaces are smooth and have a dull sheen. The overall exterior color is brownish-black. Crystalline grains with well-developed crystal faces make up the interior. Most of the center of this achondrite is heavily oxidized giving it a reddish-brown color.

Thin Section (,6) Description: Jeremy Delaney

Medium to coarse-grained ureilite with clean crystals of olivine and pyroxene. Thin section is pyroxene-rich with 120° triple junctions being quite common. Grain boundaries coated with dark material containing vein-like metal, graphite and yellow/red cathodoluminescent phase; probably diamond. Tiny metallic inclusions also occur in some pyroxene and olivine grains. Thin section shows a clear dimensionally-dependent preferred orientation of both pyroxene and olivine suggesting cumulus texture. Olivine is Fo87-92 and pyroxene is pigeonite En78-79Wo10.5.

Sample No.: EET83226 Location: Elephant Moraine
Weight (g): 33.1 Field No.: 1332
Dimensions (cm): 4 x 2.5 x 3
Meteorite Type: C2 Chondrite

Macroscopic Description: Roberta Score

No fusion crust remains on this angular carbonaceous chondrite. The exterior has a granular texture with chondrules and inclusions abundant.

Interior surfaces are blackish-brown in color whereas the exterior surfaces are black.

Thin Section (,5) Description: Brian Mason

The section shows abundant small chondrules, averaging about 0.3 mm in diameter, and numerous enclaves and mineral grains set in a moderate amount of dark brown to black opaque matrix. Chondrule types include granular and barred olivine and pale brown partly devitrified glass. Accessory amounts of finely dispersed nickel-iron and sulfide are present. Microprobe analyses show that much of the olivine is of forsteritic composition, but occasional iron-rich grains are present (Fa0.5 - Fa69, mean Fa12). Pyroxene grains are rare; composition range is Fs0.6 - Fs10. The meteorite is classed as a C2 chondrite.

Sample No.: EET83227 Location: Elephant Moraine
Weight (g): 1973.0 Field No.: 2957
Dimensions (cm): 13 x 10 x 9
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

EET83227 has a rounded shape and the exterior surfaces contain numerous deep vugs. A few millimeter-sized patches of fusion crust remain on the gray exterior. Several different clasts, the largest being 2 cm in longest dimension, are visible on the exterior. These include eucritic clasts, black fine-grained clasts, pinkish-brown crystalline clasts, and black and white clasts. Both interior and exterior surfaces contain numerous oxidation halos as large as 1-cm in diameter.

Interior surfaces are lighter gray in color than the exterior. This stone is similar to other 1983 Elephant Moraine eucrites.

Thin Section (,4) Description: Jeremy Delaney

The section is a typical polymict eucrite with one large medium-grained mafic clast containing ophitic to radial pyroxene/plagioclase intergrowths. Pyroxene and feldspar in this clast both show zoning and have little clouding.

Other clasts include breccia, shocked pyroxene and twinned feldspar. No maskelynite was seen. Coarse-grained lithic fragments, fine-grained granular mafic clasts and rare glassy fragments are also present. Three orthopyroxene grains more magnesian than En70 were located by microprobe, but diogenite-like clasts are very rare.

Sample No.: EET83228 Location: Elephant Moraine
Weight (g): 1206.0 Field No.: 2862
Dimensions (cm): 12.5 x 11.5 x 8.5
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

One small patch of black fusion crust remains on EET83228. Fracturing is moderate. The exterior surfaces are darker gray than the interior surfaces. There are many areas that are heavily oxidized. Numerous deep vugs are present on all exterior surfaces. Clasts of different types are abundant. This stone is similar to other 1983 Elephant Moraine eucrites.

Thin Section (,4) Description: Jeremy Delaney

A polymict achondrite breccia with a few small lithic clasts. These lithic clasts have the variety of textures seen in mafic clasts from howardites and polymict eucrites varying from medium-coarse granular clasts to interstitial basalts.

A few large orthopyroxene clasts have concentric zoning (cores are En70-75) suggesting exchange reactions with the surrounding breccia are present. These modified pyroxene clasts are similar to clasts in EETA79004 with which this sample may be paired.

Sample No.: EET83229 Location: Elephant Moraine
Weight (g): 312.9 Field No.: 2843
Dimensions (cm): 8 x 4 x 4
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

EET83229 looks similar to other 1983 Elephant Moraine eucrites with the exception of one large brown crystalline clast that has a dimension of 4 x 3 x 0.2 cm.

Thin Section (,5) Description: Jeremy Delaney

Typical polymict achondrite breccia with many pyroxene, plagioclase and opaque mineral clasts and a few small lithic clasts. One lithic clast has a feldspar phenocryst, which is an unusual feature for a eucritic clast.

Pyroxene clasts have various degrees of exsolution, clouding, and compositional dispersion. Feldspar clasts show variable amounts of shock modification. Many cracks filled with dark weathering products crosscut the thin section.

Sample No.: EET83231 Location: Elephant Moraine
Weight (g): 66.4 Field No.: 1344
Dimensions (cm): 5.5 x 4 x 4.5
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

This stone is very angular and contains numerous vesicles. No fusion crust is present. EET83231 looks similar to the other 1983 Elephant Moraine eucrites.

Thin Section (,4) Description: Jeremy Delaney

Polymict achondritic breccia containing several fine- and very fine-grained mafic clasts. Numerous orthopyroxene clasts similar to diogenitic pyroxene are present. Mafic clasts vary from coarse-grained subophitic basalts with and without optically zoned pyroxene and feldspar to uncommon glassy clasts with fine crystallites.

Sample No.: EET83232 Location: Elephant Moraine
Weight (g): 211.2 Field No.: 2808
Dimensions (cm): 7 x 8 x 4.5
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

EET83232 looks similar to the other 1983 Elephant Moraine eucrites.

Thin Section (,2) Description: Jeremy Delaney

Typical polymict achondrite breccia with a variety of lithic clasts. Pyroxene clasts include pigeonites with micron-scale exsolution lamellae with both clouded and unclouded grains present. Some pyroxene clasts have clear zoning that mimics the irregular clast outlines suggesting that they were metamorphosed after brecciation. Feldspar clasts have shock features and some may be recrystallized. A few feldspar clasts have abundant inclusions of clinopyroxene up to 20 microns in diameter.

Mafic clasts vary from coarse to very fine-grained and contain cloudy, exsolved pyroxene. Silica minerals in these clasts appear as both interstitial space filling settings and as coarse lathy crystals that appear to cross-cut the earlier texture. No orthopyroxene was recognized. This specimen is a polymict eucrite similar to EETA79011 and 79004.

Sample No.: EET83234 Location: Elephant Moraine
Weight (g): 180.6 Field No.: 1322
Dimensions (cm): 7.5 x 7.5 x 3
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score

EET83234 is a fragment that is similar to other 1983 Elephant Moraine eucrites. This stone contains a corner of a brown crystalline clast similar to that in EET83229 and may, in fact, actually be a piece of EET83229.

Thin Section (,3) Description: Jeremy Delaney

Typical polymict eucrite sample with a variety of small mafic clasts including extremely fine-grained and glassy clasts. Most pyroxene clasts are pigeonitic with no orthopyroxene noted. An unusual feature of this specimen is the presence of pyroxene clasts with blebby rather than lamellar exsolution. These clasts (En58-62,Wo6) may be similar to pyroxene in Binda and are rare in Elephant Moraine polymict eucrites.

Sample No.: EET83235 Location: Elephant Moraine
Weight (g): 254.6 Field No.: 2861
Dimensions (cm): 7 x 6 x 4
Meteorite Type: Basaltic Achondrite (?)

Macroscopic Description: Roberta Score

This specimen looks similar to the other 1983 Elephant Moraine eucrites except that it appears to be more weathered. A thick dark gray weathering rind is present.

Thin Section (,3) Description: Jeremy Delaney

This specimen has a very dark matrix that appears to have been produced by weathering as the section contains gypsum/anhydrite. One pyroxenite clast with two crystals up to 1-mm across may be a fragment of an orthopyroxenite but shock modification has produced inclined extinction. This clast is unexsolved. The section contains abundant pigeonite clasts with micron scale exsolution. Feldspar clasts in this section have abundant evidence of shock.

One mafic clast has a gabbroic texture and contains lathy tridymite (?) crystals over 1-mm long. Several dark glassy or extremely fine-grained clasts are present.

Sample No.: EET83236 Location: Elephant Moraine
Weight (g): 6.4 Field No.: 2761
Dimensions (cm): 2 x 2 x 1
Meteorite Type: Eucrite

Macroscopic Description: Roberta Score

Shiny black fusion crust containing flow marks covers 60% of EET83236. The interior is bluish-gray with numerous white and dark gray clasts. Several oxidation halos were noted.

Thin Section (,2) Description: Jeremy Delaney

A lightly brecciated medium-grained eucrite containing pyroxene in an ophitic to subradiate texture with generally lathy feldspar. The pyroxene is generally exsolved pigeonite with occasional "herring-bone" textures preserved. Both pyroxene and plagioclase have clouding in some crystals. Some pyroxene grains are quite clear but most are heavily clouded.

Feldspar is often clouded in patches and has mottled extinction that in places is nearly isotropic. It has, therefore, been substantially shocked. Interstitial glassy silica minerals, troilite, chromite and ilmenite are also present. Pyroxene is En36Wo2.6 to En31Wo40 and feldspar is An89.

Sample No.: EET83237 Location: Elephant Moraine
Weight (g): 882.7 Field No.: 2821
Dimensions (cm): 10 x 7 x 5.5
Meteorite Type: L6 Chondrite

Macroscopic Description: Roberta Score

A few small patches of fusion crust remain on this rounded, reddish-brown colored stone. A small area was chipped off, exposing a fracture (possibly annealed) that is preferentially weathered, a yellowish colored matrix with few inclusions, and metal flecks.

Thin Section (,3) Description: Glenn MacPherson

Moderate amounts of limonitic staining indicate light to moderate weathering.

Chondrules up to 2-mm diameter are weakly preserved. The matrix is moderately recrystallized to a polygonal-granular texture. Plagioclase (An11; Ab81-83; Or6-8) is abundant and coarse. Olivine is uniformly Fa25-26. Pyroxene (Fs23-25) is orthorhombic. Metal and troilite are subequal in abundance. Two metal phases are present, as coarse patchy intergrowths and locally as plessite. Chromite is accessory.

This meteorite is an L6 chondrite.

Sample No.: EET83246 Location: Elephant Moraine
Weight (g): 48.3 Field No.: 2724
Dimensions (cm): 4 x 3.5 x 2 cm
Meteorite Type: Diogenite

Macroscopic Description: Roberta Score

Shiny, patchy fusion crust covers one surface while dull pitted fusion crust covers the opposite surface. A highly polished fracture surface reveals the greenish-gray crystalline interior. Many inclusions are present, the largest one being 1 cm in longest dimension. Millimeter-sized oxidation spots are scattered throughout the interior.

Thin Section (,3) Description: Jeremy Delaney

Coarse-grained, brecciated diogenite with olivine, metal, troilite and chromite.

Sample No.: EET83247
Weight (g): 22.5
Dimensions (cm): 4 x 2.5 x 1.5
Meteorite Type: Aubrite (?)

Location: Elephant Moraine
Field No.: 2711

Macroscopic Description: Roberta Score

Shiny black fusion crust covers approximately one quarter of EET83247. Half of the exterior surfaces have weathered to a reddish-brown. Half is medium gray with large cream-colored clasts. One fine-grained black clast was noted. Most of the exposed interior has been heavily oxidized.

Thin Section (,4) Description: Jeremy Delaney

This is texturally similar to ALH83015 and contains lithic fragments with both pyroxene and olivine. Pyroxene composition is En72Wo2.5 and is, therefore, different from the Elephant Moraine 79002 diogenite which contains En76Wo2.

Sample No.: EET83250
Weight (g): 11.5
Dimensions (cm): <2
Meteorite Type: C2 Chondrite

Location: Elephant Moraine
Field No.: 1441

Macroscopic Description: Roberta Score

When EET83250 was first removed from its container, it existed in many pieces that could not be reassembled. It is, however, possible to distinguish between the exterior (many pieces containing fusion crust and evaporite deposit) and the interior surfaces, which are black with speckles of white inclusions. Rust spots and some evaporite deposits are visible on some of the interior pieces.

Thin Section (,3) Description: Brian Mason

Only a few chondrules and chondrule fragments are present; the bulk of the meteorite consists of brown to black semi-opaque matrix, enclosing numerous small (0.1-mm and less) colorless birefringent grains, mostly olivine. The matrix also contains trace amounts of finely dispersed nickel-iron and sulfides. Well-preserved fusion crust rims part of the section. Microprobe analyses show most of the olivine close to forsterite in composition, with a few iron-rich grains (Fa0.3 - Fa22), mean Fa4). Pyroxene grains are rare; composition range is Fs2 - Fs14. The meteorite is a C2 chondrite.

Sample No.: EET83251 Location: Elephant Moraine
Weight (g): 261.4 Field No.: 2884
Dimensions (cm): 7 x 5.5 x 4
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score
This eucrite is typical of the other 1983 Elephant Moraine eucrites.

Thin Section (,3) Description: Jeremy Delaney
This is a nice polymict achondrite containing a wide variety of clast types including pyroxene and plagioclase clasts similar to those in other EET polymict eucrites. The lithic clasts include medium-coarse gabbroic clasts with zoned pyroxene and plagioclase, fine-grained basaltic clasts, glassy (or devitrified) clasts, breccia and recrystallized breccia clasts, pyroxene-rich breccia clasts, pyroxene-rich mafic clasts and 1.5-mm orthopyroxene clasts (a few are as magnesian as En85Wo1-2). One coarse-grained mafic clast in this section contains anhedral feldspar crystals (about 200 microns) with 1-10 micron clinopyroxene inclusions of a type commonly seen only as monomineralic feldspar clasts in Victoria Land achondrites. General texture is similar to EETA79011.

Sample No.: EET83283 Location: Elephant Moraine
Weight (g): 57.2 Field No.: 1320
Dimensions (cm): 6 x 2.5 x 3
Meteorite Type: Polymict Eucrite

Macroscopic Description: Roberta Score
This eucrite is typical of the other 1983 Elephant Moraine eucrites.

Thin Section (,3) Description: Jeremy Delaney
A typical polymict achondrite with lithic and mineral clasts similar to other Elephant Moraine polymict eucrites. Some pyroxene clasts appear to be shocked orthopyroxene (En55-65) but most are pigeonitic with fine exsolution. None are as magnesian as diogenitic pyroxene. Lithic clasts are generally fine-grained basalts and breccia clasts. The matrix of this section is very dark and full of holes and cracks suggesting that it has been severely weathered. Specimen is generally similar to EETA79004 and 79011.

POSSIBLE PAIRINGS

An important task in research on Antarctic meteorites is to reliably recognize "paired" meteorite specimens that fell to Earth in common events. Previous issues of the Antarctic Meteorite Newsletter have attempted to summarize possible pairing groups that may exist among specimens from a given collection locality and a future issue of the Newsletter will include a comprehensive, updated listing of possible paired groups of. In this issue, Table 3 summarizes possible pairings among newly described specimens as suggested by their petrographic properties. However, possible pairings either listed or unlisted in Table 3 should be regarded as subject to change, based on further research.

Table 3

Possible Fall-Group Pairings Involving Meteorites Examined Since July, 1984*

"New" Sample	Meteorite Type	Possible Pairing Partner(s)
ALHA81258	C3V chondrite	ALHA81008
ALHA81260	E6 chondrite	ALHA81021
ALHA81261	H(?) chondrite	ALHA77081, ALHA81315
ALHA81315	H(?) chondrite	ALHA77081, ALHA81261
ALH83009	Aubrite	ALH83015
ALH83015	Aubrite (?)	ALH83009
ALH83102	C2 chondrite	ALH83100
EET83228	Polymict eucrite	EETA79004

* Based on suggestions made in "thin section" descriptions of meteorites as reported in Antarctic Meteorite Newsletter, 8(1).

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